Amendments to the Claims:

Please replace all prior versions, and listings of claims in the application with the following listing of claims.

Listing of claims

What is claimed is:

Claim 1 (currently amended): A method of determining a phase offset between signaling channels in a communication system, comprising the steps of:

deriving a first set of channel estimates from symbols received through a first signaling channel;

deriving a second set of channel estimates from symbols received through a second signaling channel;

deriving first and second antenna phase estimates from the first and second sets of channel estimates, respectively; and

determining an estimate of the phase offset based on [[a]] the set of first and second antenna phase estimates ~~derived from~~ without using the first and second sets of channel estimates~~, respectively~~.

Claim 2 (original): The method of claim 1, wherein the first and second signaling channels are pilot channels.

Claim 3 (previously presented): The method of claim 1, wherein the first and second signaling channels are a common pilot channel (CPICH) and a dedicated physical channel (DPCH), respectively.

Claim 4 (currently amended): A method of determining a set of complex channel estimates for a transmission channel in a communication system, comprising the steps of:

deriving a first set of channel estimates from symbols received through a first signaling channel;

deriving a second set of channel estimates from symbols received through a second signaling channel;

determining a phase offset value, φ, between signaling channels in the communication system based on a set of first and second antenna phase estimates derived from the first and second sets of channel estimates, respectively; and

determining the set of complex channel estimates ~~based on the phase offset value and~~ by compensating the first set of channel estimates based on the phase offset value.

Claim 5 (previously presented): The method of claim 4, wherein the phase offset value φ is determined by choosing φ among a set of predetermined feasible choices of φ that minimizes the following expression:

$$\min_{\varphi \in \{\pi/4, 3\pi/4, 5\pi/4, 7\pi/4\}} \sum_{i=1}^{n} \frac{(\hat{\alpha}_i - \hat{\beta}_i + \varphi)^2}{\sigma_{ei}^2}$$

where:

$i \in [1, n]$ is a rake finger number of the receiver, and

$\hat{\alpha}_i$ and $\hat{\beta}_i$ are the respective antenna phase estimates derived for rake finger i from the first and second sets of channel estimates, and

σ_{ei}^2 is related to the power of interference.

Claim 6 (original): The method of claim 5, wherein the complex channel estimate is determined by performing a linear combination of the first and second set of channel estimates.

Claim 7 (currently amended): A channel estimator adapted to operate with a receiver in a communication system and to determine a set of complex channel estimates for a transmission channel of the communication system, the channel estimator comprising:

means that derive a first set of channel estimates from symbols received through a first signaling channel;

means that derive a second set of channel estimates from symbols received through a second signaling channel;

means that determine a phase offset value, φ, between signaling channels in the communication system based on a set of first and second antenna phase estimates derived from the first and second sets of channel estimates, respectively; and

means that determine the set of complex channel estimates ~~based on the phase offset value and~~ by compensating the first set of channel estimates based on the phase offset value.

Claim 8 (previously presented): The channel estimator of claim 7, wherein the means that determine a phase offset value comprise:

means that de-rotate the symbols received through the first and second signaling channels;

means that filter the de-rotated symbols;

means that convert the filtered de-rotated symbols to polar representations;

means that calculate the phase offset value according to the polar representations.

Claim 9 (previously presented): The channel estimator of claim 8, wherein the phase offset value φ is calculated by choosing φ among a set of predetermined feasible choices of φ that minimizes the following expression:

$$\min_{\varphi \in \{\pi/4, 3\pi/4, 5\pi/4, 7\pi/4\}} \sum_{i=1}^{n} \frac{\left(\hat{\alpha}_i - \hat{\beta}_i + \varphi\right)^2}{\sigma_{ei}^2}$$

where:

$i \in [1, n]$ is a rake finger number of the receiver, and

$\hat{\alpha}_i$ and $\hat{\beta}_i$ are the respective first and second antenna phase estimates derived for rake finger i from the first and second sets of channel estimates, and

σ_{ei}^2 is related to the power of interference.

Claim 10 (original): The channel estimator of claim 7, wherein the set of complex channel estimates is determined by performing a linear combination of the first and second set of channel estimates.

Claim 11 (original): The channel estimator of claim 7, wherein the receiver is a RAKE receiver.

Claim 12 (original): The channel estimator of claim 7, wherein the receiver operates in a cellular communication system.

Claim 13 (original): The channel estimator of claim 7, wherein the first and second signaling channels are received by the receiver after transmission using transmit diversity.

Claim 14 (currently amended): User equipment for a communication system, the user equipment adapted to determine a set of complex channel estimates for a transmission channel of the communication system, the user equipment comprising:

means that derive a first set of channel estimates from symbols received through a first signaling channel;

means that derive a second set of channel estimates from symbols received through a second signaling channel;

means that determine a phase offset value, φ, between signaling channels in the communication system based on a set of first and second antenna phase estimates derived from the first and second sets of channel estimates, respectively; and

means that determine the set of complex channel estimates ~~based on the phase offset value and~~ by compensating the first set of channel estimates based on the phase offset value.

Claim 15 (previously presented): The user equipment of claim 14, wherein the means that determine a phase offset value comprise:

means that de-rotate the symbols received through the first and second signaling channels;

means that filter the de-rotated symbols;

means that convert the filtered de-rotated symbols to polar representations;

means that calculate the phase offset value according to the polar representations.

Claim 16 (previously presented): The user equipment of claim 14, wherein the phase offset value φ is calculated by choosing φ among a set of predetermined feasible choices of φ that minimizes the following expression:

$$\min_{\varphi \in \{\pi/4, 3\pi/4, 5\pi/4, 7\pi/4\}} \sum_{i=1}^{n} \frac{\left(\hat{\alpha}_i - \hat{\beta}_i + \varphi\right)^2}{\sigma_{ei}^2}$$

where:

$i \in [1, n]$ is a rake finger number of the receiver, and

$\hat{\alpha}_i$ and $\hat{\beta}_i$ are the respective first and second antenna phase estimates derived for rake finger i from the first and second sets of channel estimates, and

σ_{ei}^2 is related to the power of interference.

Claim 17 (original): The user equipment of claim 14, wherein the set of complex channel estimates is determined by performing a linear combination of the first and second set of channel estimates.

Claim 18 (previously presented): The method of claim 4, wherein the first and second signaling channels are a common pilot channel (CPICH) and a dedicated physical channel (DPCH), respectively.

Claim 19 (previously presented): The channel estimator of claim 7, wherein the first and second signaling channels are a common pilot channel (CPICH) and a dedicated physical channel (DPCH), respectively.

Claim 20 (previously presented): The user equipment of claim 14, wherein the first and second signaling channels are a common pilot channel (CPICH) and a dedicated physical channel (DPCH), respectively.

Claim 21 (currently amended): ~~The method of claim 1,~~ A method of determining a phase offset between signaling channels in a communication system, comprising the steps of:

deriving a first set of channel estimates from symbols received through a first signaling channel;

deriving a second set of channel estimates from symbols received through a second signaling channel; and

determining an estimate of the phase offset based on a set of first and second antenna phase estimates derived from the first and second sets of channel estimates, respectively,

wherein the estimate of the phase offset is determined by choosing a phase offset value, φ, among a set of predetermined feasible choices of φ that minimizes the following expression:

$$\min_{\varphi \in \{\pi/4, 3\pi/4, 5\pi/4, 7\pi/4\}} \sum_{i=1}^{n} \frac{\left(\hat{\alpha}_i - \hat{\beta}_i + \varphi\right)^2}{\sigma_{ei}^2}$$

where:

$i \in [1, n]$ is a rake finger number of the receiver, and

$\hat{\alpha}_i$ and $\hat{\beta}_i$ are the respective first and second antenna phase estimates derived for rake finger i from the first and second sets of channel estimates, and

σ_{ei}^2 is related to the power of interference.